

EXPRESS MAIL LABEL NO.:
DATE: March 28, 2002

EV064374875US

JCO2 Rec'd PCT/PTO 28 MAR 2002

FORM PTO 1390 (REV 11-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				REGIM-013	
INTERNATIONAL APPLICATION NO. PCT/FR00/02773		INTERNATIONAL FILING DATES 5 October 2000		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 10/089505	
				PRIORITY DATE CLAIMED 5 October 1999	
TITLE OF INVENTION REACTOR FOR CULTURING CELLS OR MICRO-ORGANISMS OR FOR DISSOLVING OR SUSPENDING POWDER IN A LIQUID MEDIUM					
APPLICANT(S) FOR DO/EO/US Jean Rousseau and Jean-Pascal Zambaux					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.					
2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing 35 U.S.C. 371					
3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371 (f)). The submission must include items (5), (6), (9) and (21) indicated below.					
4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).					
5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371 (c)(2))					
a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).					
b. <input checked="" type="checkbox"/> has been communicated by the International Bureau.					
c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).					
6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371 (c)(2)).					
a. <input checked="" type="checkbox"/> is attached hereto.					
b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4)					
7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))					
a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).					
b. <input type="checkbox"/> have been communicated by the International Bureau.					
c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.					
d. <input checked="" type="checkbox"/> have not been made and will not be made.					
8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).					
9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).					
10. <input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).					
Items 11 to 20 below concern document(s) or information included:					
11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.					
12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.					
13. <input type="checkbox"/> A FIRST preliminary amendment.					
14. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment					
15. <input type="checkbox"/> A substitute specification.					
16. <input type="checkbox"/> A change of power of attorney and/or address letter.					
17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.					
18. <input checked="" type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4)					
19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).					
20. <input checked="" type="checkbox"/> Other items or information: Copy of International Preliminary Examination Report (French & English), Copy of International Search Report (French & English), Two (2) Sheets of Formal Drawings, Application Data Sheet					

JC13 Rec'd PCT/PTO 28 MAR 2002

U.S. APPLICATION NO (if known, see 37 CFR 1.5) <div style="font-size: 24pt; font-weight: bold; text-align: center;">10/089505</div>		INTERNATIONAL APPLICATION NO PCT/FR00/02773		ATTORNEY'S DOCKET NUMBER REGIM-013																																																	
21. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) – (5)): <div style="margin-top: 5px;"><input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO . \$1040 00</div> <div style="margin-top: 5px;"><input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO . \$890.00</div> <div style="margin-top: 5px;"><input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740 00</div> <div style="margin-top: 5px;"><input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) . \$710 00</div> <div style="margin-top: 5px;"><input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) . \$100 00</div> <div style="margin-top: 10px;">ENTER APPROPRIATE BASIC FEE AMOUNT = Surcharge of \$ _____ for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).</div>				CALCULATIONS PTO USE ONLY <div style="border: 1px solid black; height: 150px; margin-top: 5px;"></div> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"><tr><td style="width: 50%;">\$ 890.00</td><td style="width: 50%;"></td></tr><tr><td>\$</td><td></td></tr><tr><td colspan="2" style="text-align: center;">TOTAL NATIONAL FEE =</td></tr><tr><td>\$ 585.00</td><td></td></tr><tr><td colspan="2" style="text-align: center;">Amount to be Refunded:</td></tr><tr><td>\$</td><td></td></tr><tr><td colspan="2" style="text-align: center;">Charged:</td></tr><tr><td>\$</td><td></td></tr></table>		\$ 890.00		\$		TOTAL NATIONAL FEE =		\$ 585.00		Amount to be Refunded:		\$		Charged:		\$																																	
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<div style="margin-top: 10px;">a. <input type="checkbox"/> A check in the amount of \$ _____ to cover the above fees is enclosed.</div> <div style="margin-top: 10px;">b. <input checked="" type="checkbox"/> Please charge my Deposit Account No. <u>12-1095</u> in the amount of \$ <u>585.00</u> to cover the above fees A duplicate copy of this sheet is enclosed.</div> <div style="margin-top: 10px;">c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required or credit any overpayment to my Deposit Account No. <u>12-1095</u> . A duplicate copy of this sheet is enclosed.</div> <div style="margin-top: 10px;">NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.</div> <div style="margin-top: 10px;">SEND ALL CORRESPONDENCE TO: Keith E. Gilman LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK, LLP 600 South Avenue West Westfield, New Jersey 07090 (908) 518-6308</div> <div style="margin-top: 10px; text-align: right;"><div style="display: inline-block; text-align: center;"> SIGNATURE: NAME 32,137 REGISTRATION NUMBER</div><div style="display: inline-block; vertical-align: bottom; text-align: right;">Keith E. Gilman</div></div>																																																					

2/pr15

Reactor for culturing cells or microorganisms or for
dissolving or suspending a powder in a liquid medium

5 The present invention relates to a reactor for
culturing cells or microorganisms, or for dissolving or
suspending a powder in a liquid medium.

10 One particularly advantageous application of the
invention is in the field of biotechnology, and more
particularly in the field of the pharmaceutical
industry in which cell cultures and cultures of
microorganisms are regularly used as a means of
producing therapeutic molecules.

15 One particularly advantageous application of the
invention is also in the field of pharmacy for the
manufacture of medicaments or else in the agri-
foodstuff and cosmetic fields.

20 Cultures of microorganisms such as bacteria, fungi and
yeasts are normally produced in bioreactors of large
volume allowing mass production on an industrial scale.

25 Plant cell cultures are produced instead in apparatuses
of small volume and still remain at the present time at
the development stage since the production cost hinders
their extension.

30 The culturing of animal and human cells constitutes at
the present time one of the major thrusts in the
pharmaceutical industry, as they allow new therapeutic
approaches, such as gene therapy, to be implemented.

35 This is because these cell cultures are used either as
the actual essence of the medicament within the context
of cell therapy or as a means of producing viral
vectors used in gene therapy.

Cell therapy consists in removing certain cell populations from a patient so as to cultivate them and reinject them so as to reestablish or accentuate a particular activity.

5

As regards gene therapy, this has the objective of restoring, in the tissues of a patient, a deficient biological function by introducing therapeutic genes by means of appropriate viral vectors.

10

At the present time, cell cultures and cultures of microorganisms are produced in reactors having volumes varying between 1 and 5000 liters.

15

The reactors known at the present time comprise a glass or stainless steel tank, glass being used more for the small volumes and stainless steel for the larger volumes. They also include a propeller stirrer mounted in the bottom of the tank in order to stir the culture

20

medium and keep the cells in continuous suspension.

25

Oxygenation of the culture medium in these known reactors preferably takes place with air, or else with pure oxygen, which is more difficult to regulate and which has the risk of oxidizing the culture medium. Oxygenation may also be carried out with air enriched with 30% oxygen.

30

After each culturing of cells or microorganisms, these reactors must be washed, decontaminated and rinsed. They are sterilized before each new culturing, either in an autoclave in the case of small-volume reactors or by injecting steam in the case of larger-volume reactors.

35

The operations of washing, maintaining and sterilizing these reactors are steps which are lengthy but essential for their operation.

In terms of cost, time and human resources, they may represent up to 30% of the operation of the reactor, which is very high.

5 Compared with the aforementioned prior art, the invention provides a novel reactor for culturing cells or microorganisms, which is simple, easy to use and of relatively low manufacturing cost and which is disposable.

10 More particularly, the invention provides a disposable reactor which comprises an outer envelope and at least one inner envelope which are made of plastic, these being placed in one another so as to define, on the one
15 hand, inside said inner envelope, an inner compartment and, on the other hand, between the inner and outer envelopes, at least one outer compartment, said compartments being intended to contain a liquid medium, said envelopes being closed in a sealed manner with
20 respect to the external environment and communicating with one another, which reactor is provided with means for injecting a pressurized gas into said inner compartment and means for removing said gas from said outer compartment in order to stir the liquid medium by
25 making it flow between said compartments.

The liquid medium is advantageously a culture medium.

Thus, according to the invention, this single-use
30 reactor allows the user to dispense with any washing
and maintenance operation, this representing a very
substantial saving in terms of time and money.

According to an advantageous characteristic of the
35 reactor according to the invention, each inner envelope
has an opening in its bottom and at least two lateral
openings capable of establishing communication between

the inner and outer compartments, the opening provided in the bottom of said inner envelope having a much greater cross section than those of said lateral openings.

5

The diameter of the lateral openings is determined so that said openings can allow the culture medium to pass through them at a rate sufficient to break the ascending flux of the medium between the two envelopes,
10 while said medium is being stirred.

The diameter of the opening at the bottom is determined so that the opening is large enough for the liquid flux to pass mainly through said opening and for the
15 particles of the culture medium to be completely resuspended.

According to other nonlimiting and advantageous features of the reactor according to the invention:

20 - it includes means for injecting gas into the inner compartment. The gas is advantageously pure oxygen for oxygenating the culture medium, or nitrogen in order to prevent oxygenation of the medium;

25 - each inner envelope has a band of perforations extending transversely to the longitudinal direction of said envelope, said perforations favoring transfer of the gas from one compartment to the other;

30 - the gas injection means comprise a plastic nozzle connected in a sealed manner to said inner envelope so that one of its ends emerges in the inner compartment, the other end emerging outside said reactor;

35 - said gas injection and discharge means comprise plastic nozzles connected in a sealed manner to said inner and outer envelopes respectively, so that one of their ends emerges in one of said inner and outer compartments, the other end emerging outside the

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reactor;

- each gas inlet and outlet is provided with an absolute filter so as to avoid any possible contamination by contaminating agents conveyed by said gas from the liquid medium contained in said envelopes of the reactor;

- the outer envelope of the reactor has, laterally, at least one tap-off for introducing the culture medium into said compartments;

- said inner and outer envelopes are made of a flexible material, preferably a flexible polyvinyl chloride film, or a polyurethane film; and

- the reactor includes a sampling bag made of a flexible plastic material and connected in a sealed manner to said outer envelope so that it communicates with the outer compartment in order that, with the liquid medium being stirred, part of the latter is poured out into said sampling bag.

The description which follows, in conjunction with the appended drawings, given by way of nonlimiting examples, will make what the invention consists of and how it may be realized more clearly understood.

In the appended drawings:

- figure 1 shows a front view of a preferred embodiment of the reactor according to the invention; and

- figure 2 is a table of values of volumes of the reactor according to the invention.

Figure 1 shows a disposable reactor 100 for culturing cells or microorganisms.

Of course, this reactor may be designed to be used for suspending or dissolving solid particles in a liquid medium.

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This reactor 100 comprises an outer envelope 101 and an inner envelope 102 which are made of a flexible plastic and placed in one another so as to define, on the one hand, inside said inner envelope 102, an inner
5 compartment and, on the other hand, between the inner envelope 102 and outer envelope 101, an outer compartment.

The inner envelope 102 and outer envelope 101
10 constitute flexible bags, one inserted inside the other.

The reactor 100 has here a useful volume of about 20 liters, which represents an outer envelope 101 with a
15 width of 360 mm and an inner envelope 102 with a width of about 260 mm.

The two, inner and outer, envelopes 101, 102 are positioned with respect to each other so as to be
20 concentric with respect to a longitudinal axis X.

Of course, reactors of the same type could be provided which have a larger volume, ranging up to at least
25 400 - 500 liters.

Said envelopes 101, 102 are preferably made of a flexible polyvinyl chloride film which is high-frequency weldable, inexpensive and has good mechanical strength.

30 Provision may also be made for the outer and inner envelopes to be made of polyurethane, which resists heat well and has great mechanical strength.

35 The inner envelope 102 and outer envelope 101 are closed in a sealed manner with respect to the external environment and communicate with each other.

The envelopes 101, 102 are sealed along their upper edges 101a, 102a preferably by high-frequency welding so that the weld joins them together.

- 5 The inner envelope 102 has an opening 104 in its bottom and at least two lateral openings 105 capable of establishing communication between the inner and outer compartments, the opening 104 provided in the bottom of said inner envelope having a much greater cross section
10 than that of the lateral openings.

More particularly, the opening 104 provided in the bottom of the inner envelope 102 has here a width when flat of 60 mm. This width has been carefully determined
15 so that the opening 104 is large enough for the flux of liquid culture medium to pass mainly through this opening and for the particles which have settled in the culture medium to be completely resuspended.

- 20 The diameter of the lateral openings 105 of the inner envelope 102 has been determined so that these lateral openings can allow a sufficient flow of liquid to pass through them so as to break the ascending flux of liquid medium between the two envelopes and prevent the
25 flexible inner envelope 102 from being bent during the ascent of said liquid medium in the inner compartment, thereby making it possible to obtain good homogenization of said culture medium.

- 30 The liquid medium in the reactor 100 is stirred with the aid of means for injecting a pressurized gas into said inner compartment and with the aid of means for discharging said gas from said outer compartment so as to make the culture medium flow between said
35 compartments via said openings 104, 105.

The term "pressurized gas" is understood here to mean a gas under a slight overpressure with respect to

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which is connected in a sealed manner to the inner envelope of the reactor so that one of its ends emerges in the inner compartment, the other end emerging outside the reactor, in order for it to be connected to a pure oxygen feed.

According to the embodiment shown, the pressurized gas is injected into the inner compartment simultaneously with the injection of pure oxygen via the same nozzles

Advantageously, the inner envelope 102 of the reactor includes a band of perforations 106 extending approximately transversely to the longitudinal direction X of the envelope 102, said perforations 106 favoring the transfer of pure oxygen from one compartment to the other.

The density of the perforations is determined according to the intended degree of oxygenation of the culture medium contained in said envelopes. Furthermore, the thermoplastic used to produce the inner and outer envelopes of the reactor is permeable to the gas, and especially to oxygen, so as to increase the area for exchange between the culture medium and the environment and therefore to optimize the oxygenation of the medium.

The outer envelope 101 includes, laterally, a tap-off, here a sealed plug 107 allowing the culture medium to be introduced and extracted. This tap-off 107 is protected by a suitable adhesive tamper-evident tab and can be opened by perforating the outer envelope in a perfectly sterile manner.

As figure 1 shows, the reactor furthermore includes at least one plastic pipe 108 which is connected in a sealed manner to said outer envelope (in the same way

as the other nozzles) and emerges at one end in the bottom of the inner compartment and at another end outside the reactor, in order to introduce various measurement probes.

5

In particular, it is possible to introduce a pH probe or an oxygen probe to check whether sufficient oxygen has been transferred during culturing of the medium contained in the compartments of the reactor. This pipe
10 is made of a thermoplastic and is welded to the inner and outer envelopes in a perfectly sealed manner, preferably by high-frequency welding.

The temperature in the reactor 100 is advantageously
15 regulated with the aid of a vortex tube which is connected in a sealed manner to the outer envelope and emerges at one end in the bottom of the outer compartment and at the other end outside the reactor. The vortex tube converts an ordinary compressed-air
20 supply into two streams of air: one hot and the other cold, at a pressure slightly above atmospheric pressure. A throttling valve on the hot outlet of the tube (not shown) makes it possible to adjust the flow rates and temperatures over a continuous range. This
25 heating or cooling system is regulated by a temperature probe (not shown) slipped into the pipe 108.

Advantageously, the reactor 100 may include a sampling bag (not shown) made of a flexible thermoplastic and
30 connected in a sealed manner by a weld to said outer envelope so that it communicates with the outer compartment. In this way, when the liquid medium is stirred, part of the latter is poured out into said sampling bag and samples may be taken at any moment,
35 during the culturing of the medium, with the aid of a clip which heat-seals and cuts off a sample bag from the sampling bag in order to recover a defined amount of sample of the liquid medium. This allows sequenced

sampling to be carried out.

However, provision may be made for this reactor not to have such a sampling bag and for the medium to be recovered after culturing by opening the envelopes.

The reactor is drained with the aid of a pump (not shown) provided on the upstream side with a filter which may be connected to the nozzle 103' shown in figure 1. This pump is associated with a hollow dip tube (not shown) which makes it possible to sample the medium via the bottom of the reactor 100.

According to the example shown, the minimum height of the inner envelope 102 has been set at 260 mm and the maximum height of the liquid medium in said envelopes is set here at 900 mm.

The difference between the widths of the two envelopes 101, 102 was determined by trials so that the inner envelope is wide enough and allows a large area for exchange between the liquid medium and the air or oxygen.

The volume of the outer compartment, that is to say the space provided between the two envelopes, must be large enough to allow the liquid medium to be properly removed from the inner envelope and for the culture medium to be made perfectly homogeneous.

The range of volumes for this type of reactor 100 is between 11 and 20 liters, knowing that there is complete homogenization of the medium contained in the reactor, even a 20 liter reactor. The various volumes appear in table 1 shown in figure 2.

The reactor 100 is advantageously delivered ready for use, is perfectly sterile and is optionally fitted with

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all the probes necessary for using it. It may be prefilled with the culture medium.

Furthermore, a rigid retaining tank may be provided, in
5 which said outer and inner flexible envelopes are suspended with the aid of standard suspension means. This retaining tank is then perfectly sealed and ensures that the system is secure should the outer envelope be inopportunately pierced.

10

The present invention is in no way limited to the embodiment described and shown, rather a person skilled in the art will be able to make any variant thereof in accordance with its spirit.

15

In particular, provision may be made for the inner and outer envelopes to be made of a rigid plastic.

The reactor according to the invention may also be
20 provided so as to comprise a number of envelopes greater than 2, these being imbricated in one another so as to define an inner compartment at the center of the reactor and a plurality of concentric outer compartments surrounding said inner compartment, all of
25 the compartments communicating with one another in order for the culture medium to flow between said compartments.

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perforations favoring transfer of the gas from one compartment to the other.

5 5. The reactor (100) as claimed in either of claims 3 and 4, characterized in that said gas injection means comprise a plastic nozzle connected in a sealed manner to said inner envelope so that one of its ends emerges in the inner compartment, the other end emerging outside said reactor.

10 6. The reactor (100) as claimed in one of claims 1 to 5, characterized in that said gas injection and discharge means comprise plastic nozzles (103, 103') connected in a sealed manner to said inner and outer envelopes respectively, so that one of their ends emerges in one of said inner and outer compartments, the other end emerging outside said reactor.

20 7. The reactor (100) as claimed in claim 6, characterized in that the injection of pressurized gas and of pure oxygen into said inner compartment takes place via the same nozzle (103).

25 8. The reactor (100) as claimed in one of the preceding claims, characterized in that it includes at least one plastic pipe (108) which is connected in a sealed manner to said outer envelope and emerges at one end in the bottom of the outer compartment and at the other end outside the reactor, in order to introduce a measurement probe.

35 9. The reactor (100) as claimed in one of the preceding claims, characterized in that it includes at least one vortex tube which is connected in a sealed manner to said outer envelope and emerges at one end in the bottom of the outer compartment and at the other end outside the reactor, in order to regulate the temperature of the liquid medium.

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10. The reactor (100) as claimed in one of the claims 5 to 9, characterized in that each gas inlet and outlet is provided with an absolute filter.

5 11. The reactor (100) as claimed in one of the preceding claims, characterized in that said outer envelope has, laterally, a tap-off (107) for introducing the culture medium into said compartments.

10 12. The reactor (100) as claimed in one of the preceding claims, characterized in that said outer and inner envelopes are made of a flexible material.

15 13. The reactor (100) as claimed in claim 12, characterized in that said envelopes are made of a flexible polyvinyl chloride film.

20 14. The reactor (100) as claimed in claim 12, characterized in that said envelopes are made of a polyurethane film.

25 15. The reactor (100) as claimed in one of the preceding claims, characterized in that it includes a sampling bag made of a flexible plastic material and connected in a sealed manner to said outer envelope so that it communicates with the outer compartment in order that, with the liquid medium being stirred, part of the latter is poured out into said sampling bag.

30 16. The reactor (100) as claimed in one of claims 12 to 15, characterized in that the inner and outer envelopes (102, 101) are suspended in a rigid retaining tank.

(12) DEMANDE INTERNATIONALE PUBLIÉE EN VERTU DU TRAITÉ DE COOPÉRATION
EN MATIÈRE DE BREVETS (PCT)

(19) Organisation Mondiale de la Propriété
Intellectuelle
Bureau international



(43) Date de la publication internationale
12 avril 2001 (12.04.2001)

PCT

(10) Numéro de publication internationale
WO 01/25394 A1

(51) Classification internationale des brevets⁷: C12M 1/00

Auxonne (FR). ZAMBAUX, Jean-Pascal [FR/FR]; 95,
route du Périmètre, F-74000 Annecy (FR).

(21) Numéro de la demande internationale:

PCT/FR00/02773

(74) Mandataires: MARTIN, Jean-Jacques etc.; Cabinet
Regimbeau, 20, rue de Chazelles, F-75847 Paris Cedex 17
(FR).

(22) Date de dépôt international: 5 octobre 2000 (05.10.2000)

(25) Langue de dépôt:

français

(81) États désignés (national): BR, CA, MG, US, ZA.

(26) Langue de publication:

français

(84) États désignés (régional): brevet européen (AT, BE, CH,
CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT,
SE).

(30) Données relatives à la priorité:

99/12392

5 octobre 1999 (05.10.1999)

FR

Publiée:

— Avec rapport de recherche internationale.

— Avant l'expiration du délai prévu pour la modification des
revendications, sera republiée si des modifications sont
reçues.

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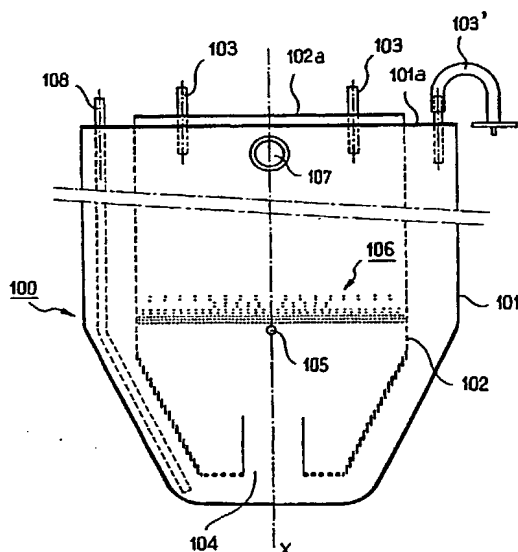
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En ce qui concerne les codes à deux lettres et autres abrégia-
tions, se référer aux "Notes explicatives relatives aux codes et
abréviations" figurant au début de chaque numéro ordinaire de
la Gazette du PCT.

(54) Title: REACTOR FOR CULTURING CELLS OR MICRO-ORGANISMS OR FOR DISSOLVING OR SUSPENDING POW-
DER IN A LIQUID MEDIUM

(54) Titre: REACTEUR POUR LA REALISATION DE CULTURES CELLULAIRES OU DE MICRO-ORGANISMES OU POUR
LA MISE EN SOLUTION OU EN SUSPENSION DE POUDRE DANS UN MILIEU LIQUIDE



(57) Abstract: The invention concerns a disposable reactor (100) for cul-
turing of cells or micro-organisms or for dissolving or suspending solid
particles in a liquid medium, comprising an outer casing (101) and at least
an inner casing (102) made of plastic material, nested into each other, said
casings being tightly closed with respect to outside environment and com-
municating with each other, and it is provided with means supplying pres-
surised gas into said casings and means for evacuating said gas outside to
stir the liquid medium contained in said casings by causing it to flow from
one casing to the other.

(57) Abrégé: L'invention concerne un réacteur (100) jetable pour la réa-
lisation de cultures de cellules ou de micro-organismes ou pour la mise en
solution ou en suspension de particules solides dans un milieu liquide, qui
comprend une enveloppe externe (101) et au moins une enveloppe interne
(102) réalisées en matière plastique, placées l'une dans l'autre, lesdites
enveloppes étant fermées de manière étanche vis-à-vis de l'environnement
extérieur et communiquant entre elles, et qui est pourvu de moyens d'arri-
vée d'un gaz sous pression dans lesdites enveloppes ainsi que de moyens
d'évacuation dudit gaz vers l'extérieur pour agiter le milieu liquide contenu
dans lesdites enveloppes en le faisant circuler d'une enveloppe à l'autre.

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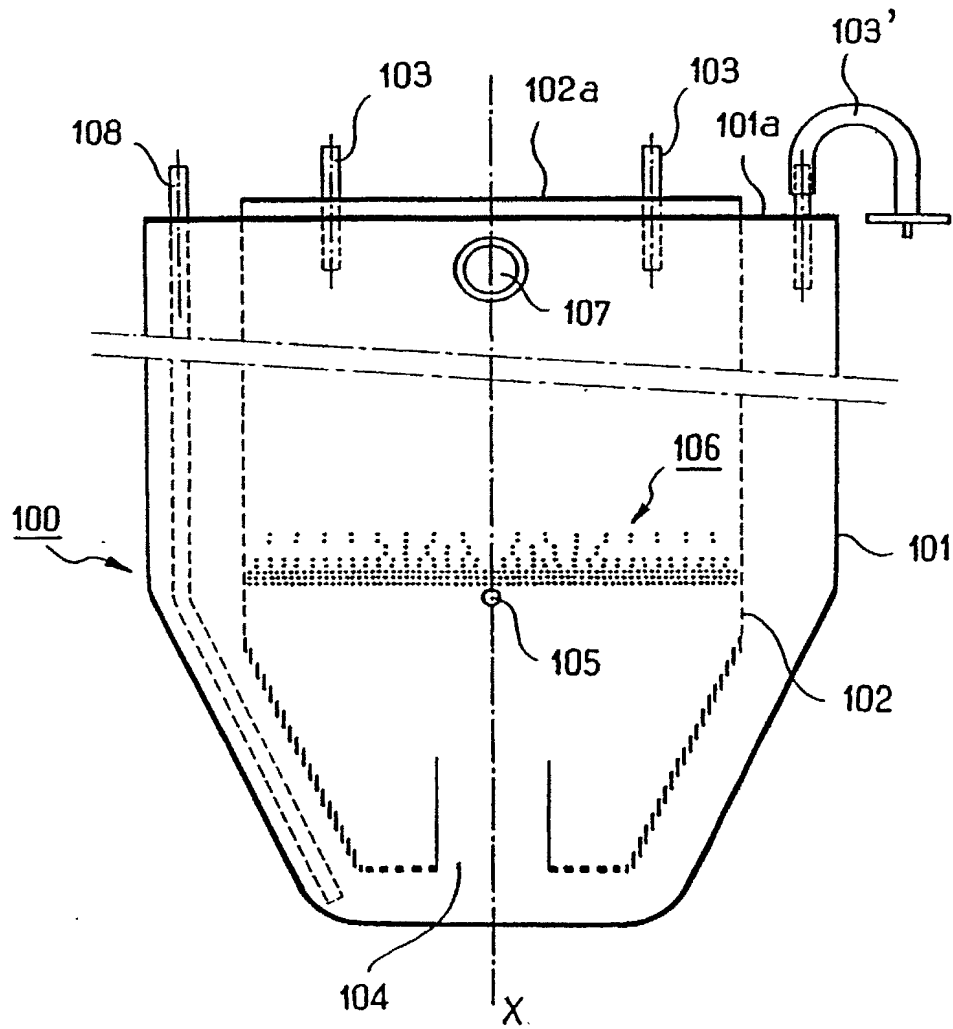


FIG. 1

Internal R.	External R.	Min. water H. (mm)	~ inner	Displaced vol. (mm ³)	~ outer	Max. water H. (mm)	Min. water h (mm)	Water vol.
83	115	260	130	2797310	142	402	260	11
83	115	270	140	3012487	153	423	270	11
83	115	280	150	3227665	164	444	280	12
83	115	290	160	3442843	174	464	290	12
83	115	300	170	3658020	185	485	300	12
83	115	310	180	3873198	196	506	310	13
83	115	320	190	4088376	207	527	320	13
83	115	330	200	4303553	218	548	330	14
83	115	340	210	4518731	229	569	340	14
83	115	350	220	4733909	240	590	350	14
83	115	360	230	4949086	251	611	360	15
83	115	370	240	5164264	262	632	370	15
83	115	380	250	5379442	273	653	380	16
83	115	390	260	5594619	283	673	390	16
83	115	400	270	5809797	294	694	400	17
83	115	410	280	6024975	305	715	410	17
83	115	420	290	6240152	316	736	420	17
83	115	430	300	6455330	327	757	430	18
83	115	440	310	6670508	338	778	440	18
83	115	450	320	6885685	349	799	450	19
83	115	460	330	7100863	360	820	460	19
83	115	470	340	7316041	371	841	470	19
83	115	480	350	7531218	382	862	480	20
83	115	490	360	7746396	393	883	490	20

FIG.2

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63) <input type="checkbox"/> Declaration Submitted with Initial Filing OR <input checked="" type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)	Attorney Docket Number	REGIM-013
	First Named Inventor	Jean Rousseau
	COMPLETE IF KNOWN	
	Application Number	UNKNOWN
	Filing Date	
	Group Art Unit	N/A
	Examiner Name	Not Yet Assigned

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original and first inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

REACTOR FOR CULTURING CELLS OR MICRO-ORGANISMS OR FOR DISSOLVING OR SUSPENDING POWDER IN A LIQUID MEDIUM

(Title of the Invention)

the specification of which



is attached hereto

OR



was filed on (MM/DD/YYYY) 10/05/2000 as United States Application Number or PCT International

Application No. PCT/FR00/02773 and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365 (a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
99/12392	FR	10/05/1999	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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A petition has been filed for this unsigned inventor

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Additional inventors are being named on the _____ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.